Heart cells divide again?

Posted: August 10, 2011

Created: 10/08/2011 - 14:30

One perplexing question in regenerative medicine is why the human heart muscle cells are unable to divide and multiply their numbers. If they could, maybe they'd be able to produce new heart cells to replace those lost after a heart attack. Newts and salamanders can do it, why can't we?

CIRM grantees at the University of California, Los Angeles have found one answer to the question, which could lead to a way of turning the cell's clock back to a time when they could still divide. Robb MacLellan, who was senior author on the work published in the Aug. 8 issue of the Journal of Cell Biology, said that the ability to divide is a trade off. A UCLA press release wrote:

" MacLellan believes the reason adult human cardiac myocytes can't [divide] is quite simple â when the myocytes are in a more primitive state, they are not as good at contracting, which is vital for proper heart function. Because humans are much larger than newts and salamanders, we needed more heart contraction to maintain optimum blood pressure and circulation.
MacLellan suggests that it might be possible to get the heart cells dividing again by blocking the proteins that are halting the cell cycle. The press release had this explanation:

" When a heart attack occurs, oxygen is cut off to part of the heart, causing the cardiac myocytes to die and resulting in scar tissue. It's easy to locate the damaged area of the heart, and if a way could be developed to reprogram a patient's own myocytes, the protein manipulation system could be injected into the damaged area, reverting the myocytes to their primitive state and replacing the dead muscle with new, living muscle, MacLellan said.

"People have been talking about the regenerative potential of these lower organisms for a long time and why this does not occur in humans" MacLellan said. "This is the first paper that provided a rationale and mechanism for why this happens."

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"From my point of view, this is a potential mechanism to regenerate heart muscle without having to harvest or expand stem cells," MacLellan said. "Each person would be their own source for cells for regeneration."
MacLellan has two CIRM Basic Biology (Basic Biology I, Basic Biology III) awards to study human heart progenitor cells.

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